

# PATENT COOPERATION TREATY

From the **TOWNSEND & TOWNSEND**  
INTERNATIONAL SEARCHING AUTHORITY

To:  
Annette S. Parent  
Townsend and Townsend and Crew LLP  
Two Embarcadero Center, Suite 2000  
San Francisco, CA 94111

00 JUL 17 AM 10:28

RECEIVED

## PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT  
OR THE DECLARATION

(PCT Rule 44.1)

Date of Mailing  
(day/month/year)

13 JUL 2000

Applicant's or agent's file reference

NONE 018512-002020 PC

FOR FURTHER ACTION See paragraphs 1 and 4 below

International application No.

PCT/US00/04441 ✓

International filing date

(day/month/year)

22 February 2000 (22.02.2000) ✓

Applicant

ICAGEN, INC.

1. ☒ The applicant is hereby notified that the international search report has been established and is transmitted herewith.  
Filing of amendments and statement under Article 19: 9-13-00  
The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the international search report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland  
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Further action(s): The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau.  
If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in rules 90 bis 1 and 90 bis 3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231  
Facsimile No. (703)305-3230

Authorized officer

Ulrike Winkler, Ph.D.

Telephone No. 703-308-0196

Form PCT/ISA/220 (July 1998)

**DOCKETED**

Amendment Jms

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference NONE	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/US00/04441 ✓	International filing date (day/month/year) 22 February 2000 (22.02.2000) ✓	(Earliest) Priority Date (day/month/year) 23 February 1999 (23.02.1999) ✓
Applicant ICAGEN, INC.		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 5 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the Report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☒ Unity of invention is lacking (See Box II).

4. With regard to the title,



the text is approved as submitted by the applicant. ✓



the text has been established by this Authority to read as follows:

5. With regard to the abstract,



the text is approved as submitted by the applicant. ✓



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.



None of the figures

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/04441

## Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:  
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐  
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

**BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING** This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-13, 15, 23 and 24, drawn to isolated nucleic acids and vectors.

Group II, claim 14, drawn to a method of detecting the isolated nucleic acids.

Group III, claims 16-21, drawn to polypeptides.

Group IV, claim 22, drawn to antibodies.

Group V, claims 25-32, drawn to a method of identifying a compound that increases or decreases the flux of the potassium channel.

Group VI, claims 33-41 and 49-56, drawn to a method of identifying a the potassium channel subunits in a sample

Group VII, claim(s) 42-48, drawn to a method of computer modeling compounds that interact with the potassium channel.

The inventions listed as Groups I-VII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, as they lack the same or corresponding special technical features for the following reasons:

The technical feature linking groups I-VII appears to relate to a potassium channel beta-subunit. However, Rettig et al. (1994) teach potassium channels that are made up of two types of subunits, the membrane bound, pore forming alpha subunit and a peripheral beta subunit. The reference discloses the cloning and sequencing of a beta subunit. Therefore, the technical feature linking groups I-VII does not constitute a special technical feature as defined by PCT Rule 13.2, as it does not define a contribution over the prior art.

The special technical feature of group I is considered to be nucleotide sequences that encode the beta-subunit of a potassium channel.

The special technical feature of group II is considered to be a method of detecting the nucleic acids encoding a beta-subunit of the potassium channel.

The special technical feature of group III is considered to be amino acid sequences of the beta-subunit of a potassium channel.

The special technical feature of group IV is considered to be the antibodies directed to the beta-subunit of a potassium channel.

The special technical feature of group V is considered to be a method of detecting compounds that modulate a potassium channel activity.

The special technical feature of group VI is considered to be a method of detecting a potassium channel subunits in a sample.

The special technical feature of group VII is considered to be a method of computer modulating compounds that effect a potassium channel activity.

Accordingly, groups I-VII are not so linked by the same technical feature as to form a single general inventive concept.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/04441

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C07K 1/00

US CL : 530/350

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 364/578; 435/4, 6, 7.2, 69.1, 320.1; 514/1; 530/350, 389.1; 536/23.5; 935/11

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X, P	RIAZI et al. Identification of a putative regulatory subunit of a calcium-activated potassium channel in the dup(3q) syndrome region and related sequence on 22q11.2. Genomics. November 1999, Vol. 62, No. 1, Abstract only.	1, 3, 7, 8, 12, 15
Y, P		16, 18
X, P	EP 0 936 271 A1 (SYNTHELABO) 18 August 1999 (18.08.99), see entire document.	1, 2, 4, 6, 7, 9-17, 19, 21, 22, 23, 24, 49-56
Y, P		25-41,
X, P	WALLNER et al. Molecular basis of fast inactivation in voltage and Ca <sup>2+</sup> -activated K <sup>+</sup> channels: a transmembrane beta-subunit homolog. Proceedings of the National Academy of Sciences. March 1999, Vol. 96, pages 4137-4142, see entire document.	1, 5-16, 20, 21, 25-27, 29, 32
Y, P		28, 30, 31, 33- 41, 49-56
Y	RETTIG et al. Inactivation properties of voltage-gated K <sup>+</sup> channels altered by presence of beta-subunit. Nature. 26 May 1994, Vol. 369, pages 289-294.	25
A		26-41, 49-56
Y	RHODES et al. Voltage-gated K <sup>+</sup> channel beta subunits: expression and distribution of KvB1 and KvB2 in adult rat brain. Journal of Neuroscience. 15 August 1996, Vol. 16, No. 16, pages 4846-4860.	1, 2, 21, 22
A		25-41, 49-56



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

04 June 2000 (04.06.2000)

Date of mailing of the international search report

13 JUL 2000

Name and mailing address of the ISA/US

Commissioner of Patents and Trademarks

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Authorized officer

Ulrike Winkler, Ph.D.

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/04441

## C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,680,331 A (BLANEY et al.) 21 October 1997 (21.10.97).	42-48
A	US 5,526,281 A (CHAPMAN et al.) 11 June 1996 (11.06.96).	42-48